



A Steerable Distance Enhanced Penetrometer Delivery System



Developer: UTD, Inc.
Contract Number: DE-AR21-94MC31178
Cross-Cutting Area: CMST

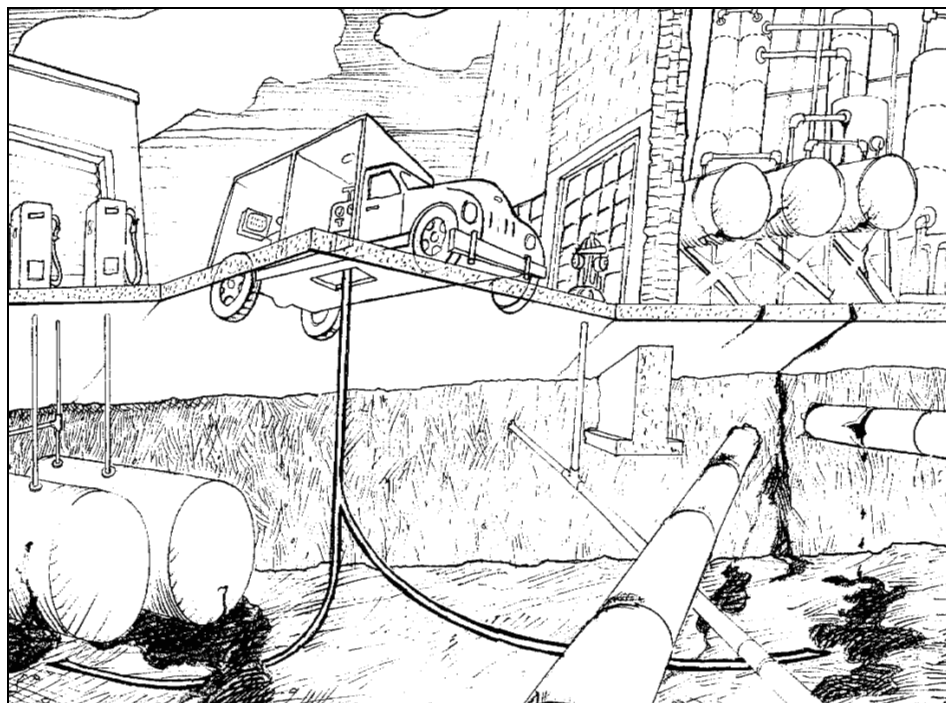
Subsurface
Contaminants
FOCUS AREA

Problem:

POLO, a unique real-time, in situ position location determination device for use on penetrometers has been developed and demonstrated under DOE sponsorship. The advantage provided by POLO is that the operator now has the capability to know the exact position of his sampling locations. The basic problem of the inability to direct penetrometers to specific locations and penetrate through stiff geologic materials still looms, while the need to characterize beneath buildings and other structures can still only be done at great expense.

Solution:

A result of POLO's successful development is the emergence of new opportunities to make major advances in characterization and remediation. Specifically, penetrometers armed with POLO for position location, can now be enhanced further to perform directional penetration to points of interest. A whole new generation of penetrometer delivery systems capable of both steerable penetration and improved penetrability by vibratory means can now be developed on the basis that the POsition-LOcation aspect of the development is essentially solved.



Benefits:

A steerable and vibratory enhanced penetrometer delivery system for characterization sensors will provide:

- ▶ Directional control of penetrometers to specific points of interest beneath or adjacent to structures, underground obstacles, and magnetic material.
- ▶ Improved distance capability by vibratory thrusting of the penetrometer system.

▶ A reduction in the hazard associated with accidental puncture of underground storage tanks.

Technology:

With the advent of POLO, which provides position location for penetrometers on a point by point basis through measurement of rod bending and distance traveled into the borehole, the use of penetrometers as a steerable tool becomes feasible. This project focuses on technology development to provide steering capability



through mechanical systems at the tip of the penetrometer rod and through control of the orientation of the tip mechanism. Since a steerable penetrometer is only successful if the rod does not break during bending, POLO will also be used to monitor bending to allow operators to stay within the bend limit of their system. Bends along the length of the rod during steering to a specific underground location also reduce the effectiveness of the available thrusting force to attain reasonable distances of penetration. Integration of a vibratory thrusting system and POLO is also key to this project.

development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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DOE's Morgantown Energy Technology Center supports the Environmental Management - Office of Science and Technology by contracting the research and

